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**Datasheet for the decision
of 24 January 2020**

Case Number: T 0982/16 - 3.3.01

Application Number: 10716404.8

Publication Number: 2422198

IPC: G01N33/487

Language of the proceedings: EN

Title of invention:

LIPID BILAYER SENSOR ARRAY

Patent Proprietor:

Oxford Nanopore Technologies Limited

Opponent:

OLSWANG LLP

Headword:

Sensor array/OXFORD NANOPORE TECHNOLOGIES

Relevant legal provisions:

EPC Art. 100(c)

EPC R. 115(2)

RPBA Art. 15(3)

Keyword:

Grounds for opposition - added subject-matter (no)
Summons to oral proceedings - non-attendance of party

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 0982/16 - 3.3.01

D E C I S I O N
of Technical Board of Appeal 3.3.01
of 24 January 2020

Appellant: Oxford Nanopore Technologies Limited
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Decision under appeal: **Interlocutory decision of the Opposition**
Division of the European Patent Office posted on
11 February 2016 concerning maintenance of the
European Patent No. 2422198 in amended form

Composition of the Board:

Chairman A. Lindner
Members: T. Sommerfeld
 P. de Heij

Summary of Facts and Submissions

- I. European patent No. 2422198 is based on application No. 10716404.8, which was filed as an international application and published as WO 2010/122293. The patent is entitled "Lipid bilayer sensor array" and was granted with 11 claims.

- II. Opposition was filed against the granted patent, with the opponent requesting revocation of the patent in its entirety on the grounds of lack of inventive step (Articles 56 and 100(a) EPC) and added subject-matter (Article 100(c) EPC).

- III. With an interlocutory decision announced at oral proceedings, the opposition division decided that the patent could be maintained in amended form on the basis of the second auxiliary request, filed during oral proceedings on 25 January 2016 (Articles 101(3)(a) and 106(2) EPC).

The opposition division considered that the claims according to the main request (claims as granted) added subject-matter, contrary to Article 123(2) EPC, and did not admit the first auxiliary request into the proceedings.

- IV. The patent proprietor (appellant) lodged an appeal against that decision. With the statement of the grounds of appeal, the appellant requested that the patent be maintained as granted (main request) or, alternatively, according to the first auxiliary request, filed on 21 June 2016 with the grounds of appeal. New documents were submitted.

- V. The opponent (respondent) has not submitted any reply.
- VI. Summons for oral proceedings before the board were issued. In a communication pursuant to Article 15(1) RPBA 2007, the board provided a detailed preliminary opinion on Article 100(c) EPC and on the admission of the first auxiliary request.
- VII. Oral proceedings before the board took place as scheduled, in the absence of the respondent, who had given notice in its letter dated 9 October 2019 that it would not be represented at oral proceedings. At the end of the oral proceedings the chairman announced the board's decision.
- VIII. The appellant's submissions, in so far as they are relevant to the present decision, may be summarised as follows:

There was a basis in the application as filed for claim 1 as granted, including for the alternative "layer of other amphiphilic molecules". Concerning the two points raised in the opposition proceedings in relation to this feature, the opposition division decided that there was a basis for the intermediate generalisation (i.e. for the combination with the other features of the claim) but considered that there was no basis for the step of inserting membrane proteins into an amphiphilic layer. This second point, on which the opposition division relied, had not been raised until the oral proceedings. Moreover, the decision was not properly reasoned in this respect and relied on incorrect law, namely on a "support test" rather than on the gold-standard test. While a verbatim basis was indeed only present on page 6, lines 9 to 10 of the application as filed, the feature was implicitly

disclosed because, read as a whole, the application as filed taught the skilled person that the particular alternative applied to the invention in general and not only to the single step mentioned on page 6. From e.g. page 4, paragraph starting at line 29, and page 5, line 2, it was apparent that natural membranes other than the usual lipid bilayers were also envisaged. The passage on page 6, referring to Figure 2, described a series of steps to be carried out when preparing the sensor device. It was implicit that all the steps applied to both alternatives, i.e. to lipid bilayers and layers of other amphiphilic molecules, even if this was not explicitly stated.

- IX. The appellant requested that the decision under appeal be set aside and that the patent be maintained as granted (main request), implying that the opposition be rejected, or, alternatively, that the patent be maintained according to the first auxiliary request, filed with the statement of grounds of appeal.

There are no requests on file from the respondent.

Reasons for the Decision

1. The appeal is admissible.
2. The oral proceedings before the board took place in the absence of the respondent, who was duly summoned but decided not to attend.

According to Rule 115(2) EPC if a party duly summoned to oral proceedings does not appear as summoned, the proceedings may continue without that party. As stipulated by Article 15(3) RPBA 2007, the board is not

obliged to delay any step in the proceedings, including its decision, by reason only of the absence at the oral proceedings of any party duly summoned who may then be treated as relying on its written case. Furthermore, Article 12(2) RPBA 2007 *inter alia* requires the respondent to present its complete case in the reply to the statement of grounds of appeal. In accordance with Article 12(4) RPBA 2007, the board must take such submissions into account if admissible and relating to the case under appeal.

In the present case, the respondent has not filed any submissions or requests in writing during the appeal proceedings. Although it had had ample opportunity to present its written comments on the facts and evidence on file (e.g. after the appellant filed its grounds of appeal and/or after the board issued its communication annexed to the summons), it decided not to do so. The provisions of Article 113(1) EPC, which govern the right to be heard, have been fulfilled in respect of the respondent since it was the party's own choice to remain silent throughout the appeal proceedings. Accordingly, the board needs only to consider the appellant's arguments for setting aside the decision under appeal.

3. Main request - Article 100(c) EPC

3.1 The main request concerns the claims as granted.
Claim 1 reads as follows:

"1. A method of sensing an interaction of a molecular entity with a membrane protein in a lipid bilayer (26) or layer of other amphiphilic molecules, the method comprising:

providing a sensor device (2) comprising an array of sensor elements each arranged to support a lipid bilayer (26) or layer of other amphiphilic molecules in which a membrane protein is capable of insertion and including respective electrodes (22), each sensor element being arranged to output an electrical signal at the electrode that is dependent on an interaction of a molecular entity with a membrane protein in a lipid bilayer (26) or layer of other amphiphilic molecules with a quality of performance that is variable depending on whether a membrane is formed and on the number of membrane proteins inserted;

characterised by the steps of:

providing a detection circuit (3) comprising a plurality of detection channels (30) each capable of amplifying an electrical signal from one of the sensor elements, the number of sensor elements in the array being greater than the number of detection channels (30);

providing a switch arrangement (31) capable of selectively connecting the detection channels (30) to respective sensor elements; and

controlling the switching arrangement (31) to selectively connect the detection channels to respective sensor elements in respect of which a lipid bilayer (26) or layer of other amphiphilic molecules is formed and an acceptable number of effective membrane proteins are inserted, on the basis of the amplified electrical signals that are output from the detection channels (30)."

It differs from claim 1 as originally filed as shown:

"1. A method of sensing ~~a physical phenomenon~~ an interaction of a molecular entity with a membrane

protein in a lipid bilayer (26) or layer of other amphiphilic molecules, the method comprising:
providing a sensor device (2) comprising an array of sensor elements each arranged to support a lipid bilayer (26) or layer of other amphiphilic molecules in which a membrane protein is capable of insertion and including respective electrodes (22), each sensor element being arranged to output an electrical signal at the electrode that is dependent on ~~a physical phenomenon~~ an interaction of a molecular entity with a membrane protein in a lipid bilayer (26) or layer of other amphiphilic molecules with a quality of performance that is variable depending on whether a membrane is formed and on the number of membrane proteins inserted;
characterised by the steps of:
providing a detection circuit (3) comprising a plurality of detection channels (30) each capable of amplifying an electrical signal from one of the sensor elements, the number of sensor elements in the array being greater than the number of detection channels (30);
providing a switch arrangement (31) capable of selectively connecting the detection channels (30) to respective sensor elements; and
controlling the switching arrangement (31) to selectively connect the detection channels to respective sensor elements ~~that have acceptable quality of performance~~ in respect of which a lipid bilayer (26) or layer of other amphiphilic molecules is formed and an acceptable number of effective membrane proteins are inserted, on the basis of the amplified electrical signals that are output from the detection channels (30).

3.2 The feature that the physical phenomenon to be sensed is "an interaction of a molecular entity with a membrane protein in a lipid bilayer" has a basis in originally filed claim 6, which is indirectly dependent on claim 1. Original claim 6 also provides a basis for the feature that the sensor elements are "each arranged to support a lipid bilayer in which a membrane protein is capable of insertion".

3.3 As regards the features relating to the quality of performance (the performance being stated as being variable "depending on whether a membrane is formed and on the number of membrane proteins inserted" and the acceptable quality of performance being defined as "a lipid bilayer (...) is formed and an acceptable number of effective membrane proteins are inserted"), the following is noted. Originally filed claim 7 reads: "A method according to claim 6, wherein the quality of performance of the sensor elements is variable depending on whether a lipid bilayer is formed and on the number of membrane proteins inserted, and said acceptable quality of performance is that a lipid bilayer is formed and that an acceptable number of effective membrane proteins are inserted." Hence these new features of claim 1 are almost verbatim identical to original claim 7, with the sole difference that in the first part reference is made to "membrane" instead of "lipid bilayer" as in the original claim. The board agrees with the opposition division's conclusions (page 3 of the decision, penultimate paragraph, in combination with the third paragraph) that this inconsistency does not raise issues under Article 123(2) EPC because, while it might render the claim unclear, it has no bearing on the scope of the claim since the skilled person would understand the two terms to be synonymous in the context of the claim.

- 3.4 The only feature which does not have a basis in the originally filed claims is the alternative "layer of other amphiphilic molecules". This feature is mentioned only once in the application as filed, namely in the sentence on page 6, lines 9 to 10, which reads: "The sensor device 2 is prepared to form a lipid bilayer 26 or layer of other amphiphilic molecules across each well 21 and to insert membrane proteins into the lipid bilayer 26."
- 3.5 This sentence is the opening sentence of a paragraph which describes the preparation of the sensor device 2 depicted in Figure 2. While this sentence refers to two alternative layers formed across each well, namely a lipid bilayer or a layer of other amphiphilic molecules, the rest of the paragraph, which teaches how the membrane proteins are inserted into the layer, mentions only the lipid bilayer. Nowhere in the paragraph is it taught that membrane proteins are inserted into a layer of amphiphilic molecules other than a lipid bilayer.
- 3.6 From the general disclosure of the application as filed it is apparent that a sensor device to be used in a method of the invention may comprise an ion channel, preferably a biological ion channel, such as a membrane protein ion channel (page 4, lines 35 to 36). The biological ion channels will typically be present in a membrane, which may be a solid-state membrane or a biological membrane, the latter including lipid bilayers (page 5, lines 2 to 5). It would thus be immediately apparent for the skilled person that if a layer of different amphiphilic molecules is used rather than a lipid bilayer, the same structure of membrane ion channels inserted into the membrane (i.e. into the

amphiphilic layer) must still be present in a sensor device according to the invention. Accordingly, the board considers that while not explicitly disclosed in the application as filed, it is implicit that a sensor device can be formed of a lipid bilayer or of a layer of other amphiphilic molecules, and that in each case membrane proteins are inserted into the layer.

3.7 In this context the board disagrees with the opposition division's conclusions on page 3 (fourth paragraph) of the decision under appeal, according to which "the 'layer of other amphiphilic molecules' as originally disclosed had no relationship with a claimed feature, namely the 'insertion of a membrane protein', nor would it seem immediately obvious to the skilled person that a membrane protein can be inserted into any layer of amphiphilic molecules". As regards this latter argument, the board notes that this argument is one of a lack of technical support, which is not relevant in the context of Article 123(2) EPC. Moreover, contrary to the opposition division's conclusions, the board considers that the application does teach the insertion of membrane proteins into different types of membranes, as disclosed e.g. on page 4, line 35 to page 5, line 5 of the application as filed, a layer of amphiphilic molecules being an example of a membrane.

3.8 Finally, the application also provides a basis for using sensor devices in general for sensing any physical phenomena (e.g. original claim 1) and in particular for sensor devices comprising lipid bilayers or layers of other amphiphilic molecules with inserted membrane proteins (see above) for sensing interaction of a molecular entity with a membrane protein in such layers. Although the alternative of "layers of other amphiphilic molecules" is only explicitly disclosed in

the sentence on page 6, lines 9 to 10, it is clear that it is given as an example of an equally suitable alternative membrane to a lipid bilayer, the latter being disclosed throughout the application and in combination with the other features of the claim (e.g. original claims 6 and 7). Hence, the board considers that there is a basis for the combination of the disputed feature with the other features of granted claim 1.

3.9 The inclusion of the feature "layer of other amphiphilic molecules" thus fulfils the requirements of Article 123(2) EPC. Since there are no further objections on file concerning added subject-matter, the board comes to the conclusion that Article 100(c) EPC does not prejudice the maintenance of the patent as granted.

3.10 Article 100(c) was the only ground evoked during the opposition for considering the main request not allowable. No further grounds were raised on appeal. Hence the board comes to the conclusion that the main request is allowable.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The opposition is rejected.

The patent is maintained unamended.

The Registrar:

The Chairman:



M. Schalow

A. Lindner

Decision electronically authenticated